The impact of decisions related to the use of products of biotechnology in agriculture

Environmental and Economic Benefits of Biotechnology in the Brazilian Agriculture, 2009

US Embassy
London, UK
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Agenda

The biotechnology in the Brazilian context

The benefits resulting from the adoption of biotechnology in Brazil

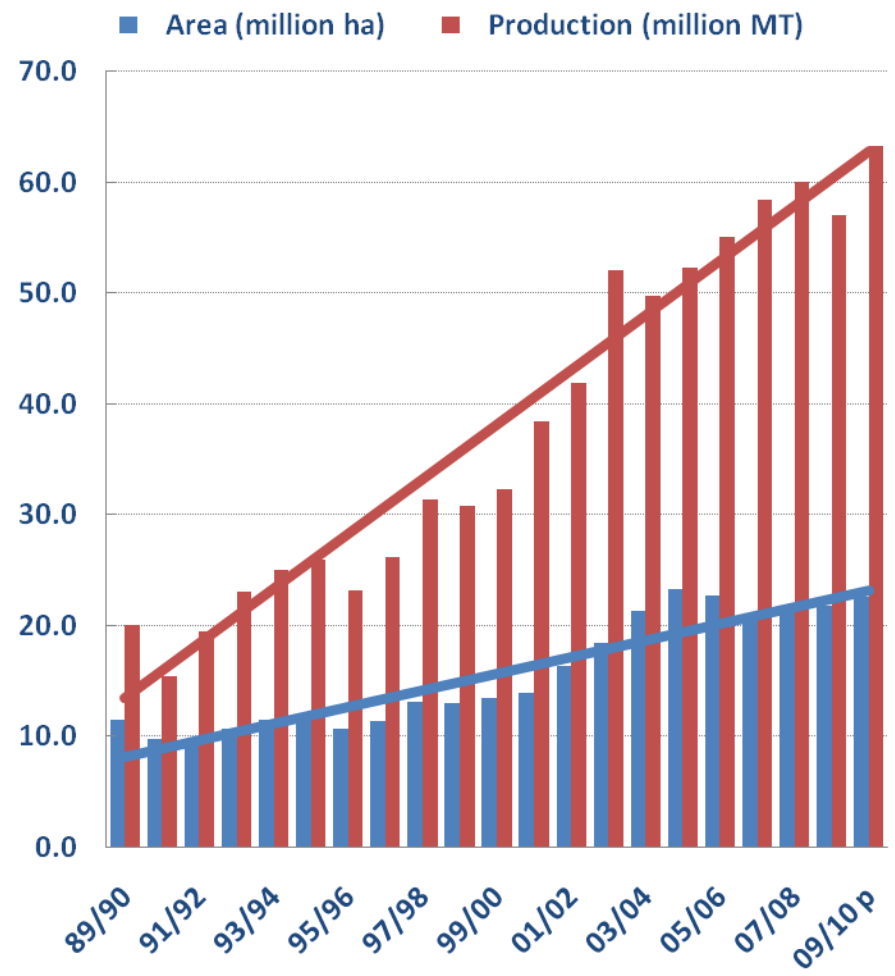
- The field survey
- Environmental benefits
- Direct economic benefits

Final remarks

Soybean production in Brazil

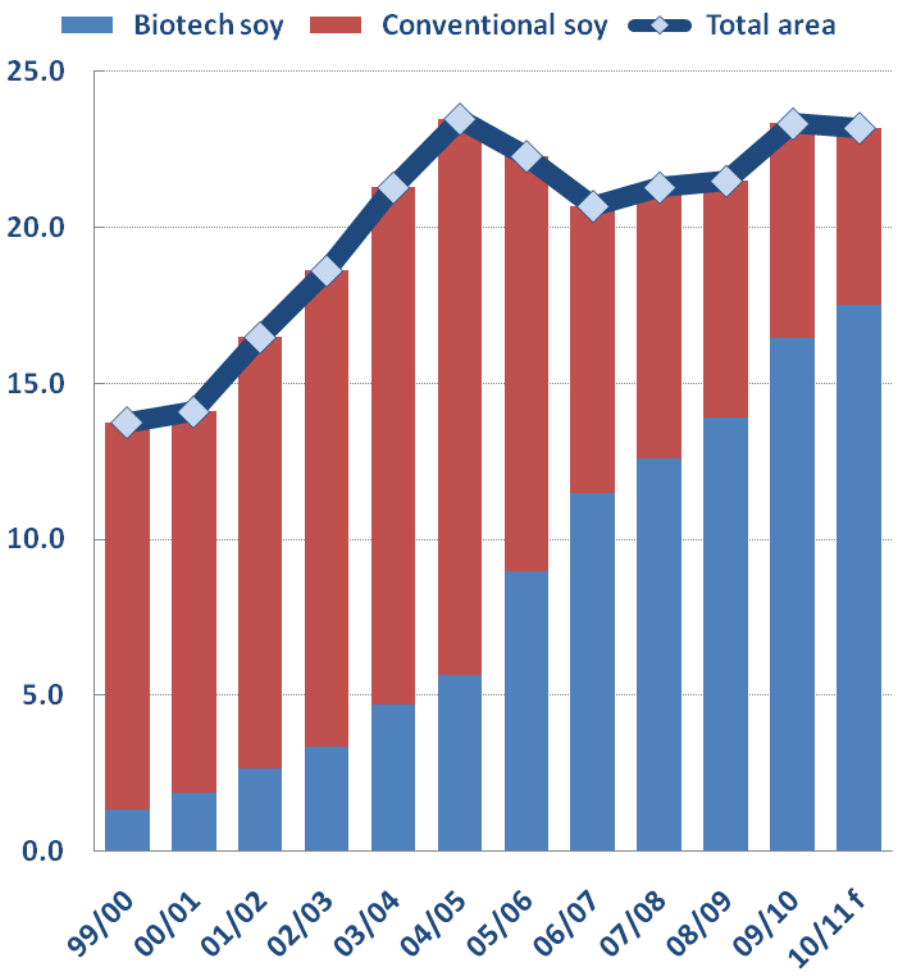
High gains of productivity in the last twenty years

Soybean production in Brazil



Source: CONAB/CÉLERES®
Area in million hectares

Biotech soybean adoption rate in Brazil

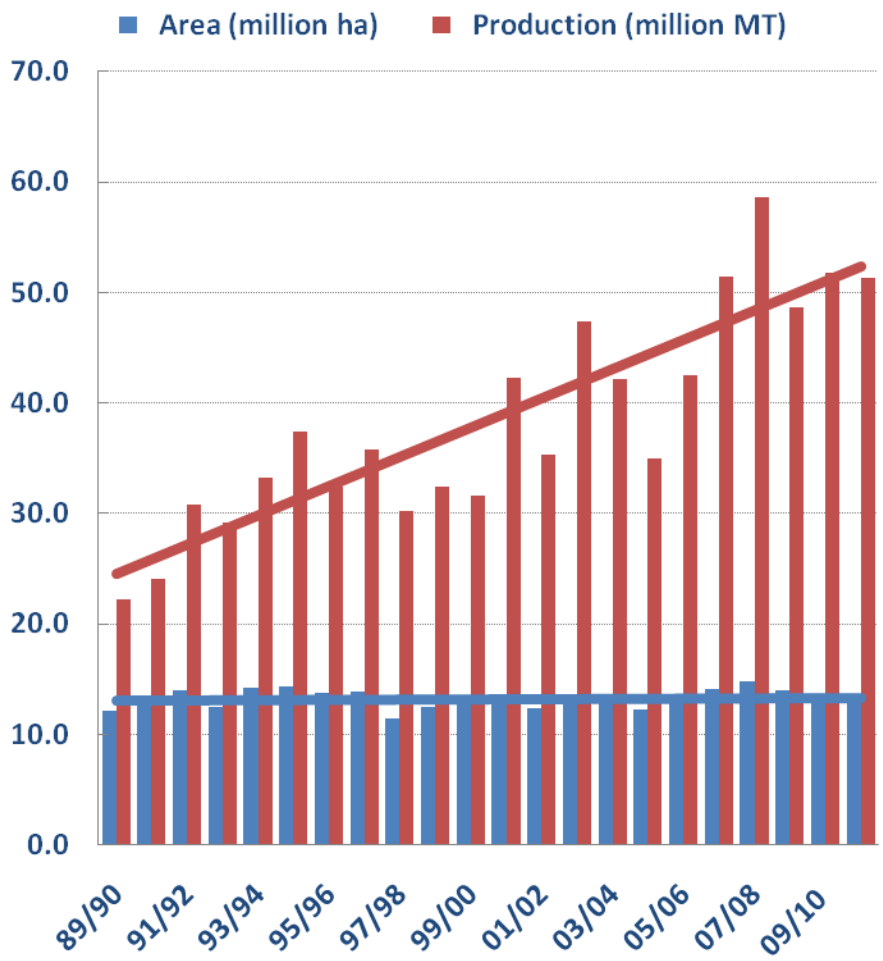


Source: CÉLERES® August/2010
Assuming herbicide tolerant soybean varieties

Corn production in Brazil

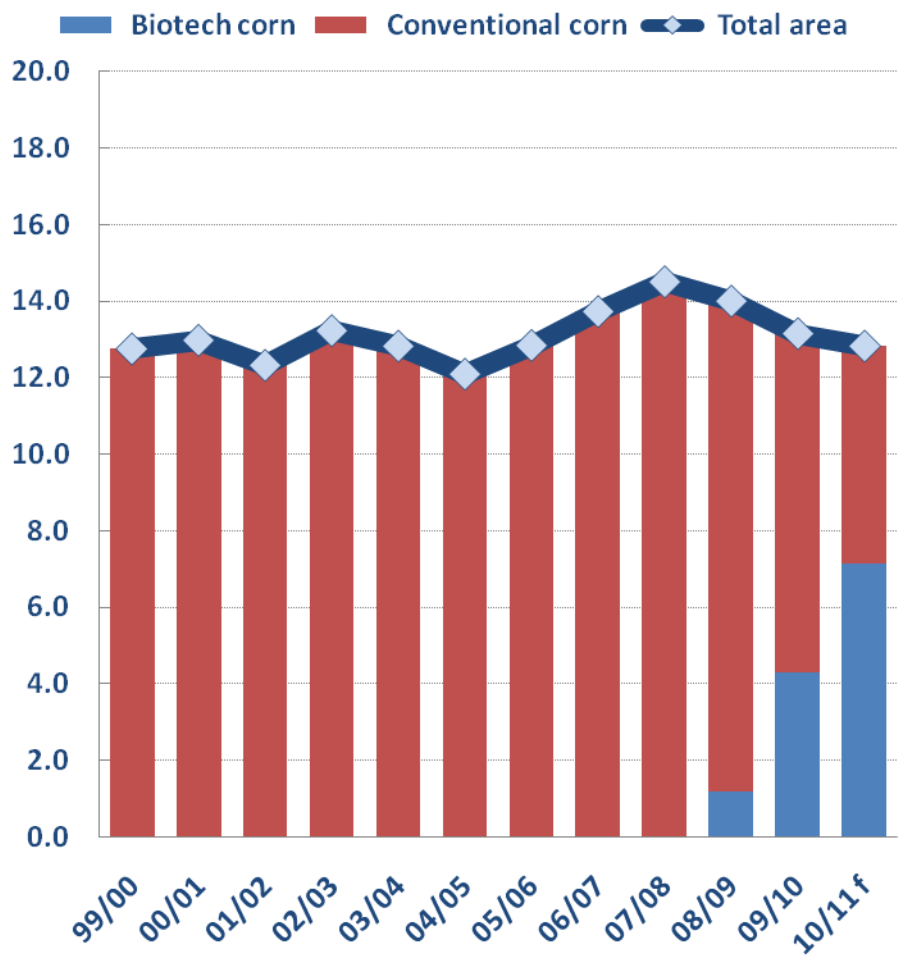
The country goes through a breakthrough in the technological patterns for corn

Corn production in Brazil



Source: CONAB/CÉLERES®
Area in million hectares

Biotech corn adoption rate in Brazil

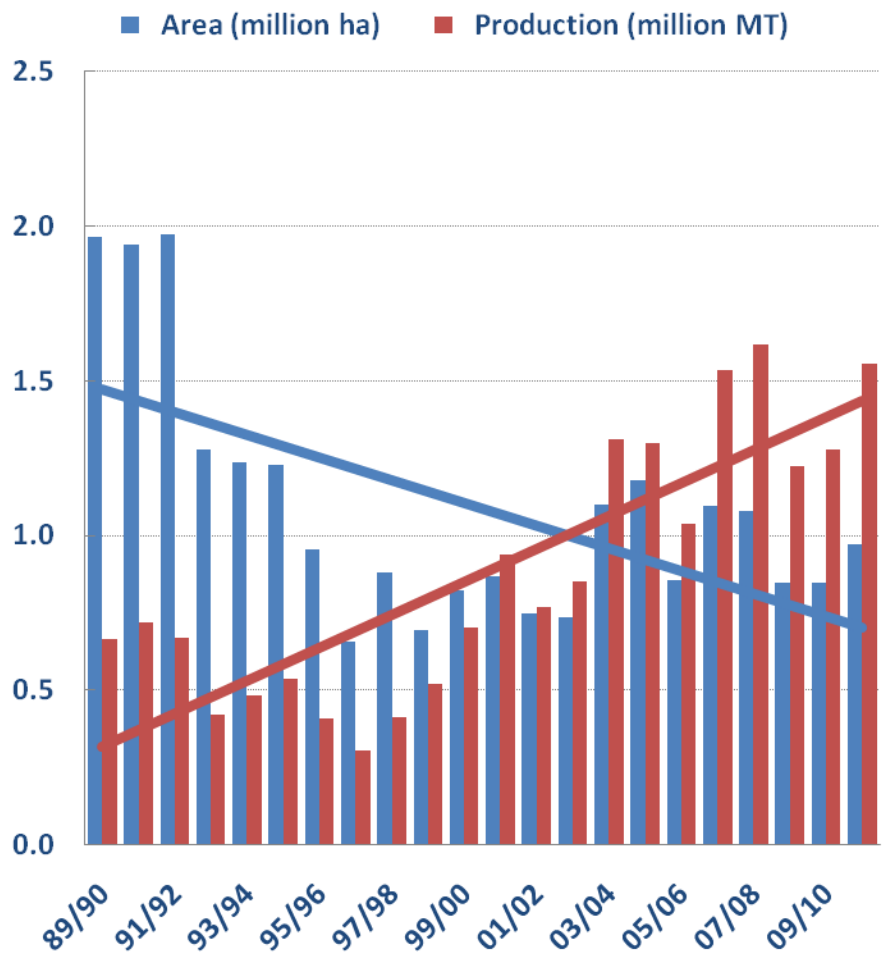


Source: CÉLERES® August/2010
Assuming insect resistant corn hybrids

Cotton production in Brazil

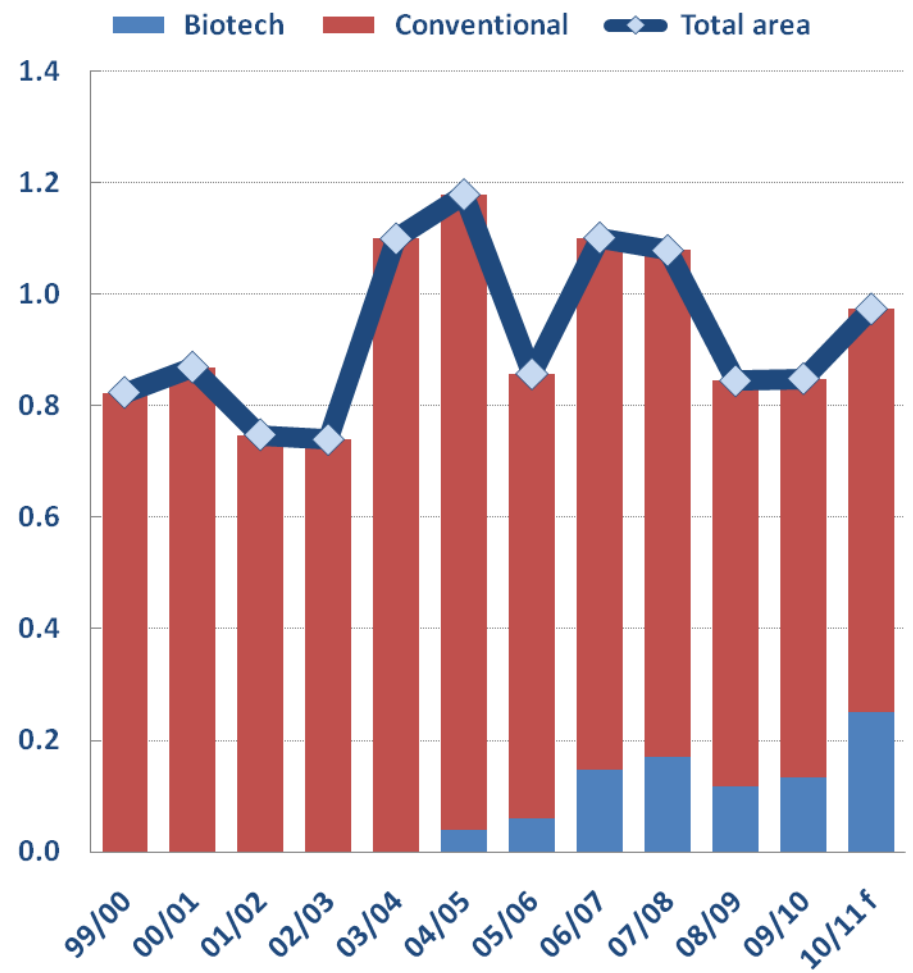
A highly competitive sector in the global marketplace

Cotton production in Brazil



Source: CONAB/CÉLERES®
Area in million hectares

Biotech cotton adoption rates in Brazil

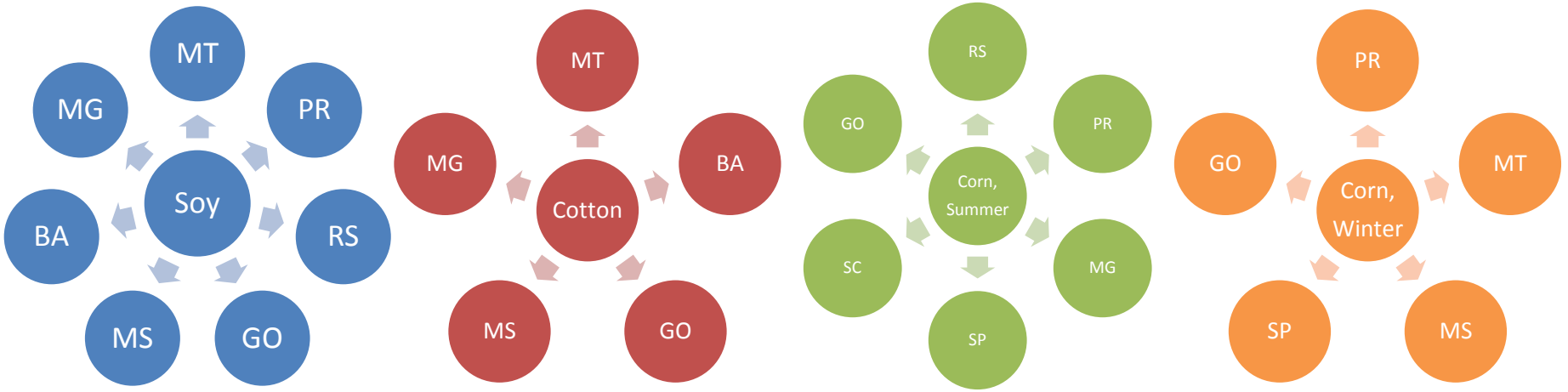


Source: CÉLERES® August/2010
Assuming insect resistant cotton. Herbicide tolerant cotton from 2010/11

Through the last three years, Céleres® has been tracking the benefits of biotech adoption in Brazil, covering the key crops

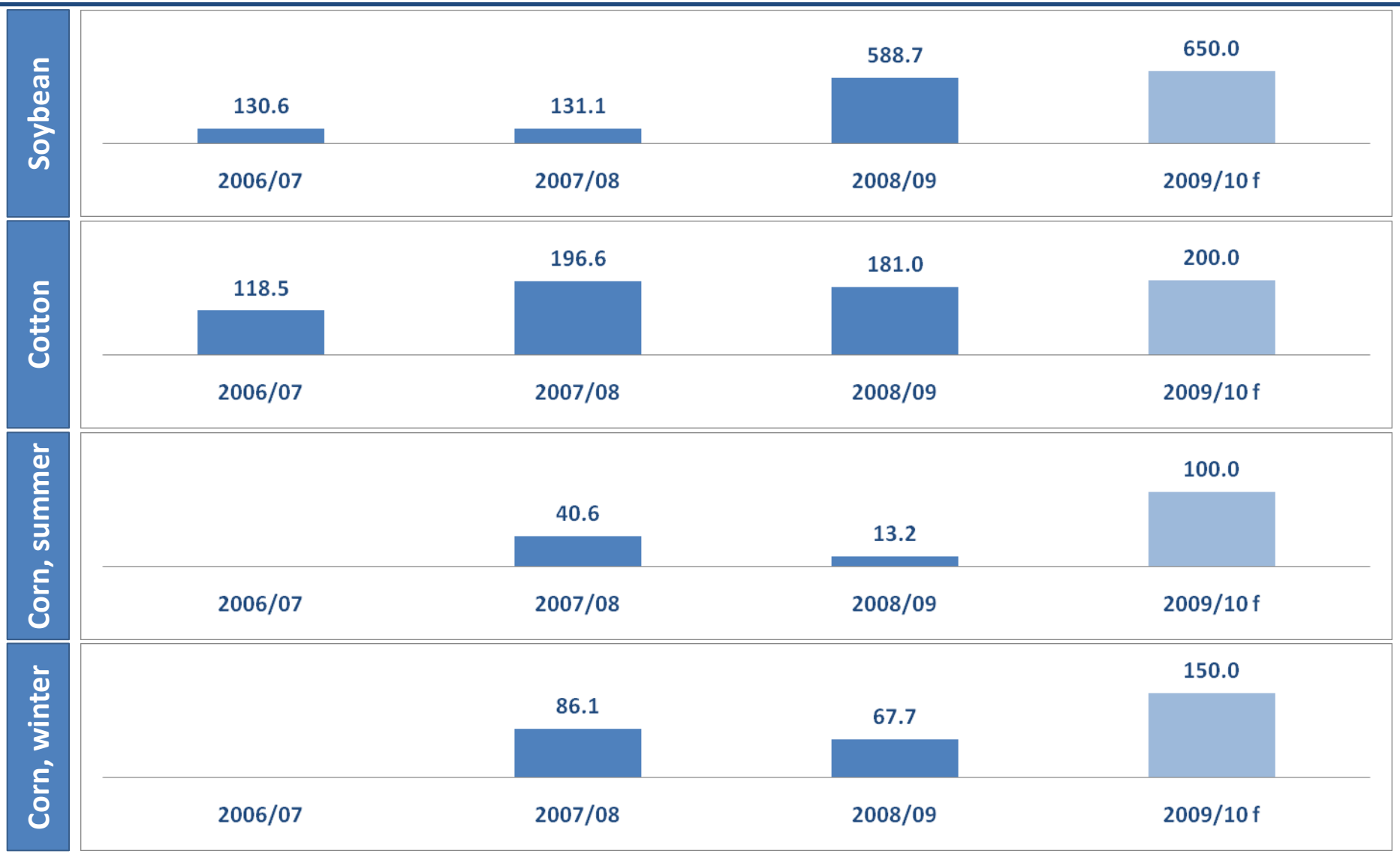
- Over 1,000 farmers, spread out in the main growing areas of cotton, corn and soybean were interviewed by the Céleres® and Céleres Ambiental® team
- The survey methodology includes:
  - *Small farmers*
  - *Mid size farmers*
  - *Big farmers*

Brazilian states covered in the annual biotech survey



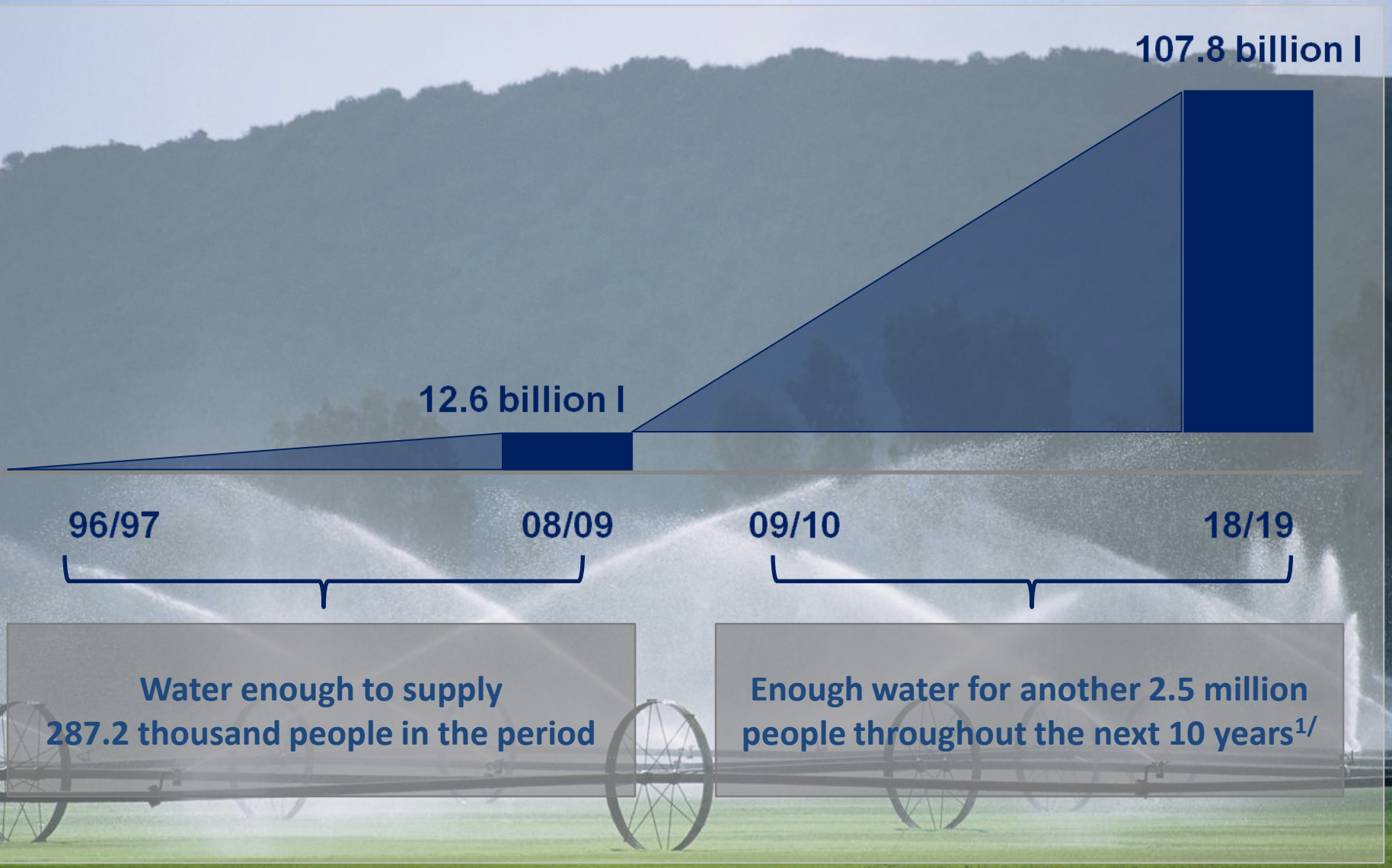
Source: CÉLERES®/CÉLERES AMBIENTAL®

More than 1.5 million hectares were sampled in the last three years



Source: CÉLERES®

Biotech adoption in Brazil allowed a substantial reduction of water deployed on chemical spraying



Source: CÉLERES AMBIENTAL® based on proprietary research

1/ Assuming the UN recommendation of 120 l/day/inhabitant

With the reduction of the diesel oil usage, the farmers also generate meaningful benefits in the form of environmental services

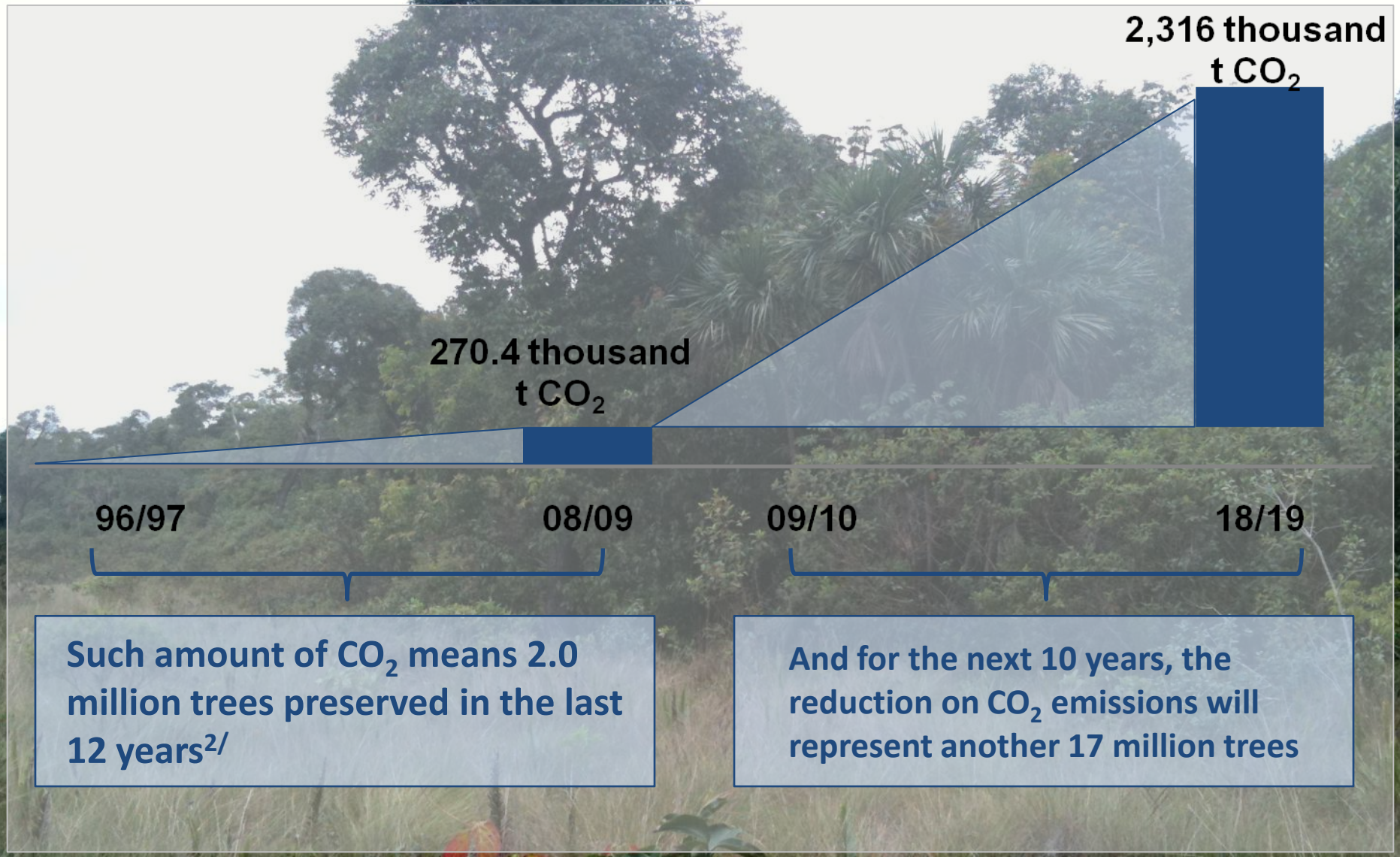
Diesel oil enough to fuel a car fleet of 43.7 thousand vehicles in the last 12 years[2/]

For the next ten years, the diesel savings through biotech adoption will be enough to fuel another 374.3 thousand vehicles

Source: CÉLERES AMBIENTAL® based on proprietary survey

[1/] Assuming a light diesel vehicle running 24,000 km/year with average millage of 10 km/l

And as a consequence of a smaller use of diesel oil, a lesser emission of CO_2 is noticed



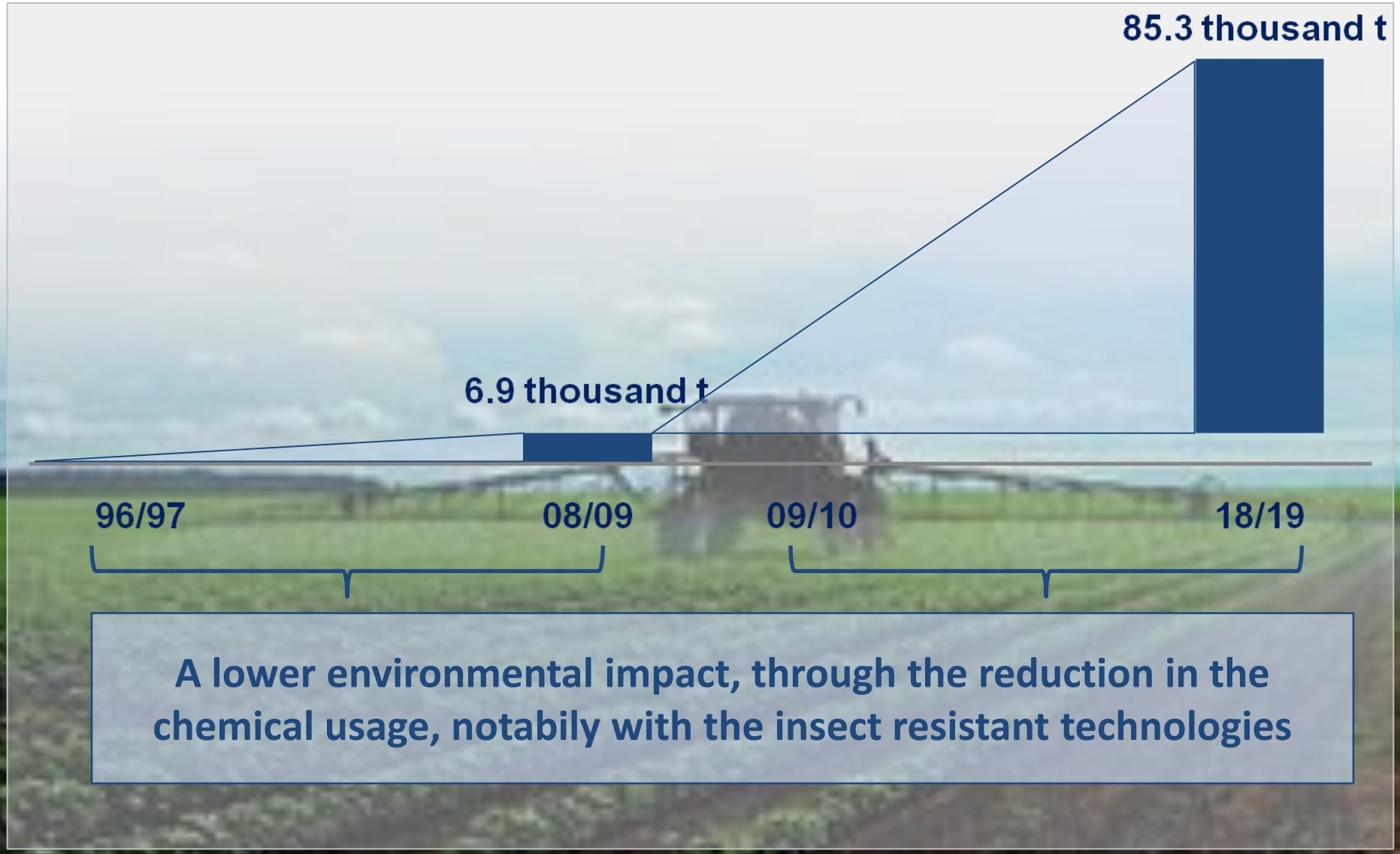
Such amount of CO_2 means 2.0 million trees preserved in the last 12 years[2/]

And for the next 10 years, the reduction on CO_2 emissions will represent another 17 million trees

Source: CÉLERES AMBIENTAL® based on proprietary survey

[3/] Assuming riparian trees assuming 7.38 trees/CO_2t

And finally, there is also the reduction in the use of pesticides, through the adoption of biotechnology



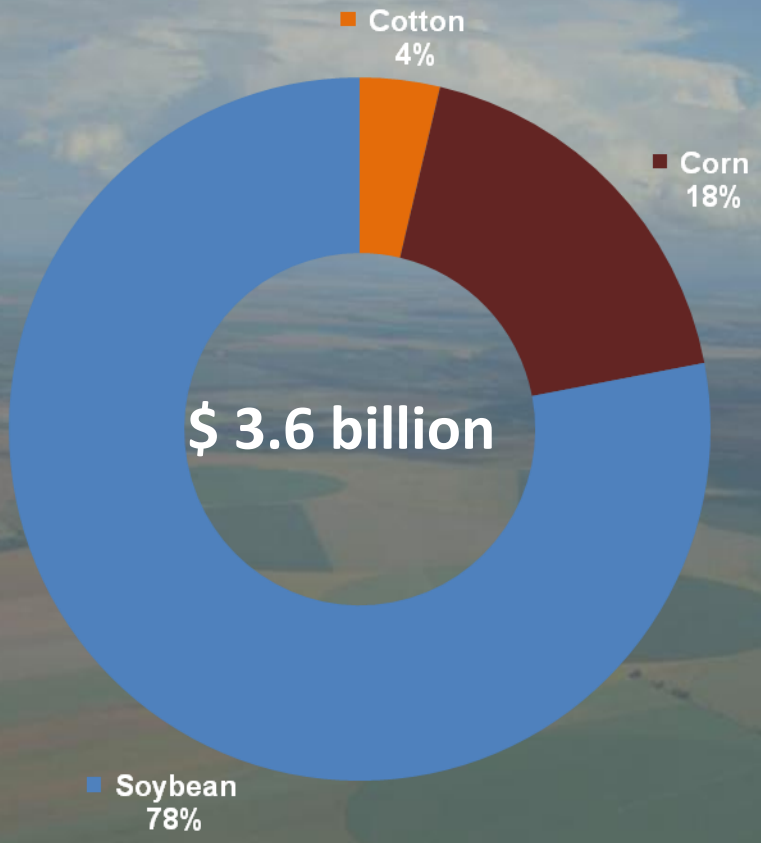
A lower environmental impact, through the reduction in the chemical usage, notabily with the insect resistant technologies

Source: CÉLERES AMBIENTAL® based on proprietary survey

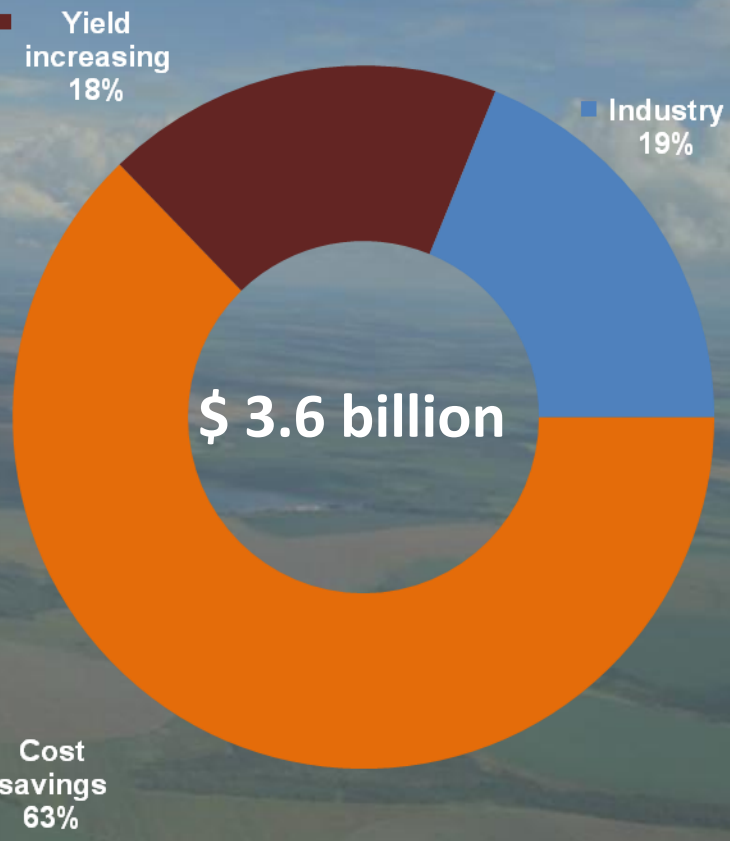
Since 1996/97, the Brazilian farmers accumulate nearly US$ 4 billion as direct benefits from the biotechnology adoption

Direct benefits of Agri biotech adoption in Brazil: 1996/97 – 2008/09

Direct economic benefit, by crop



Direct economic benefit, by segment

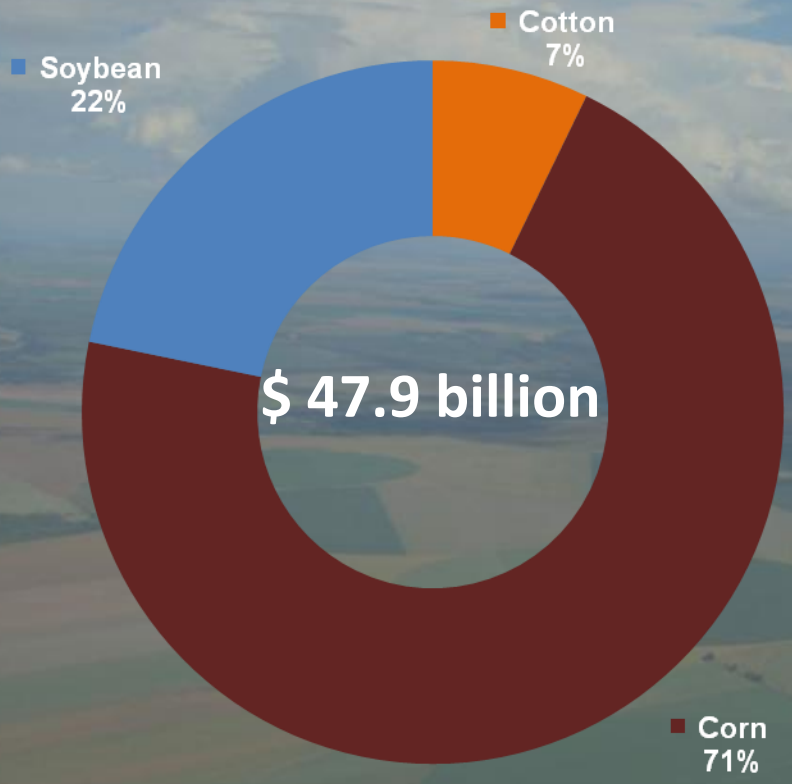


Source: CÉLERES® based on proprietary survey
Soybean (1996/97 - 2008/09); cotton (2004/05 - 2008/09) ; corn (2008/09)

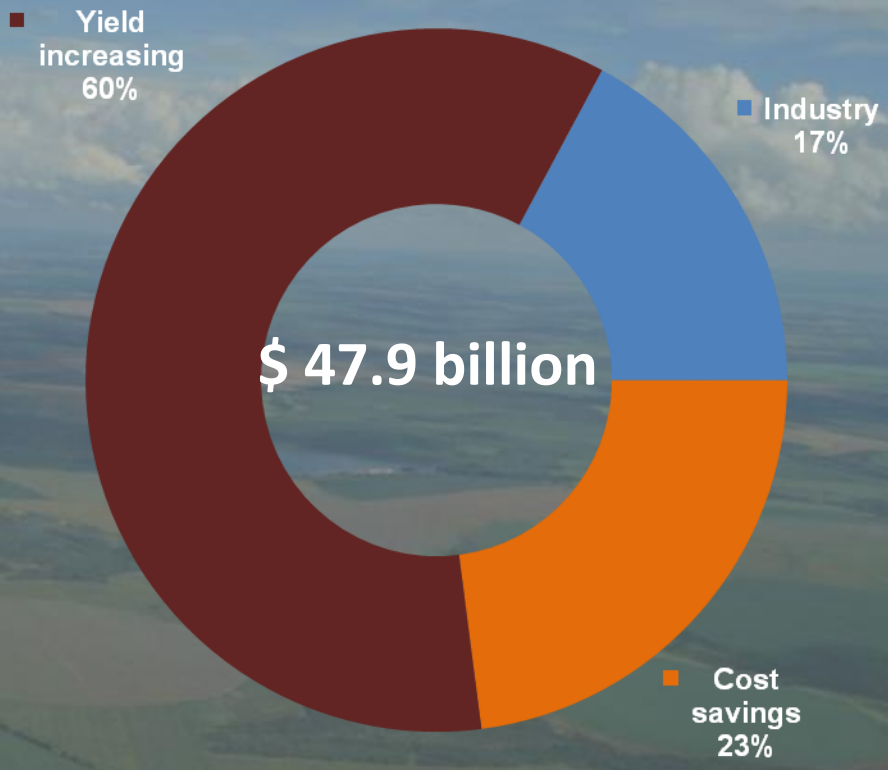
Assuming the current pattern of technology adoption and its benefits, in the next ten years, the benefits might achieve US$ 48 billion

Direct benefits of Agri biotech adoption in Brazil : 2009/10 – 2018/19

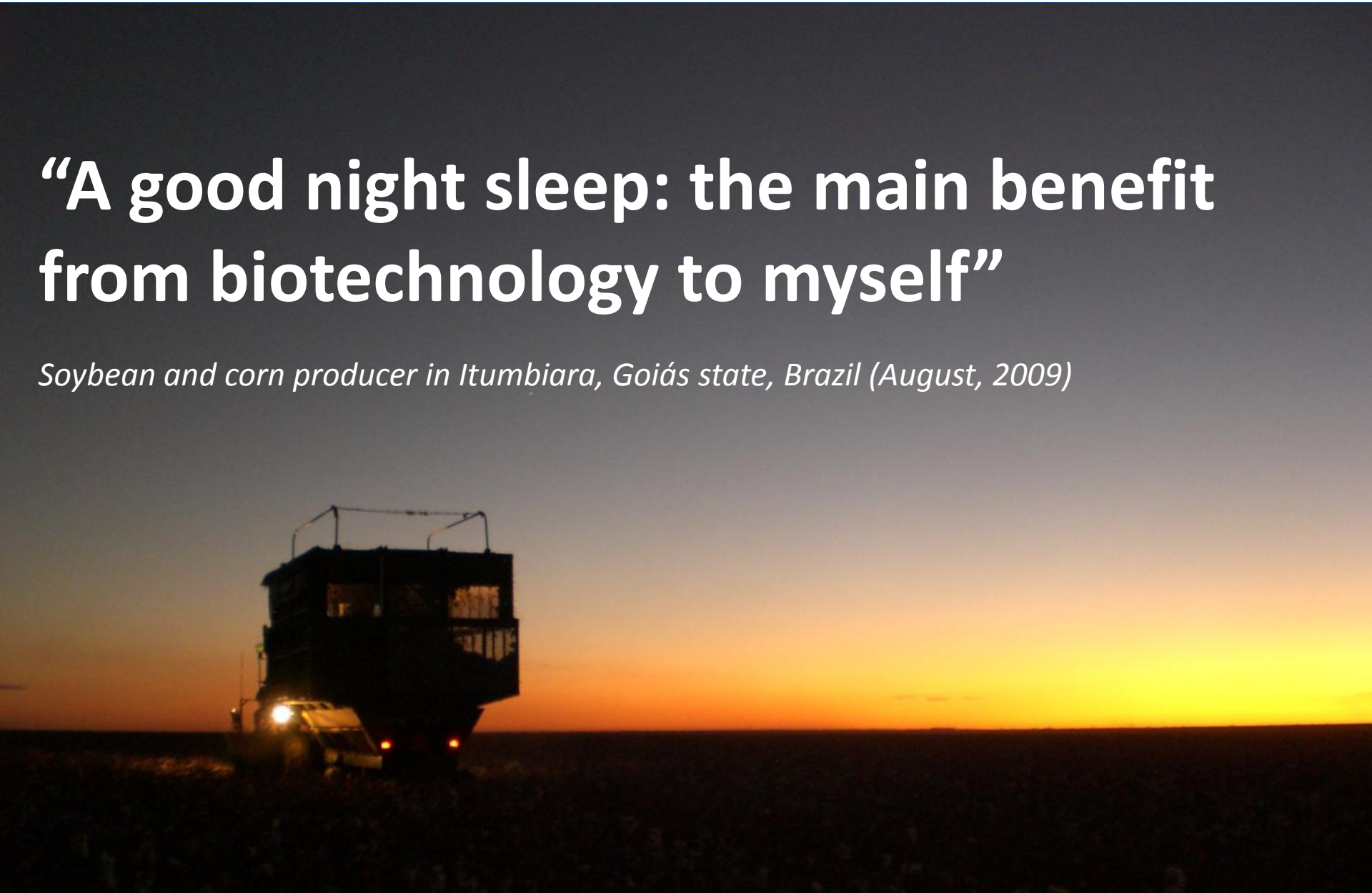
Direct economic benefit, by crop



Direct economic benefit, by segment



Source: CÉLERES® based on proprietary survey



"A good night sleep: the main benefit from biotechnology to myself"

Soybean and corn producer in Itumbiara, Goiás state, Brazil (August, 2009)

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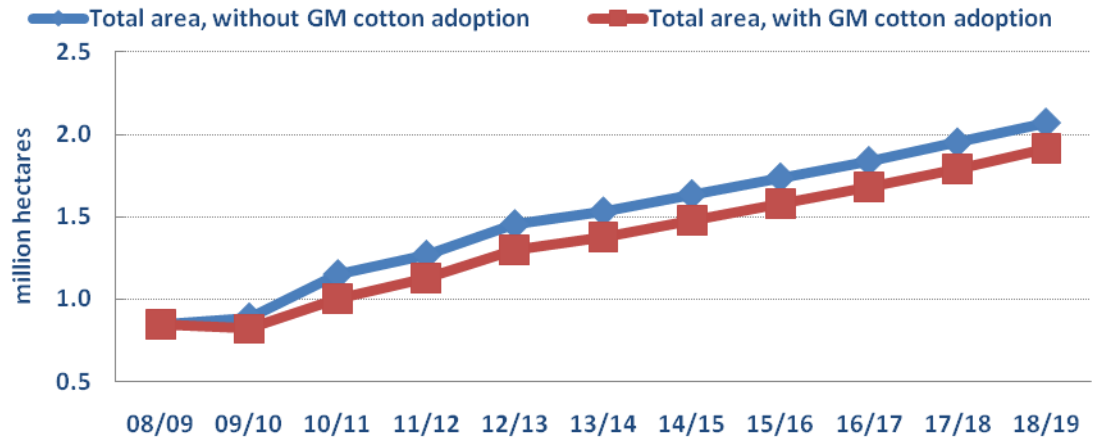
Final remarks

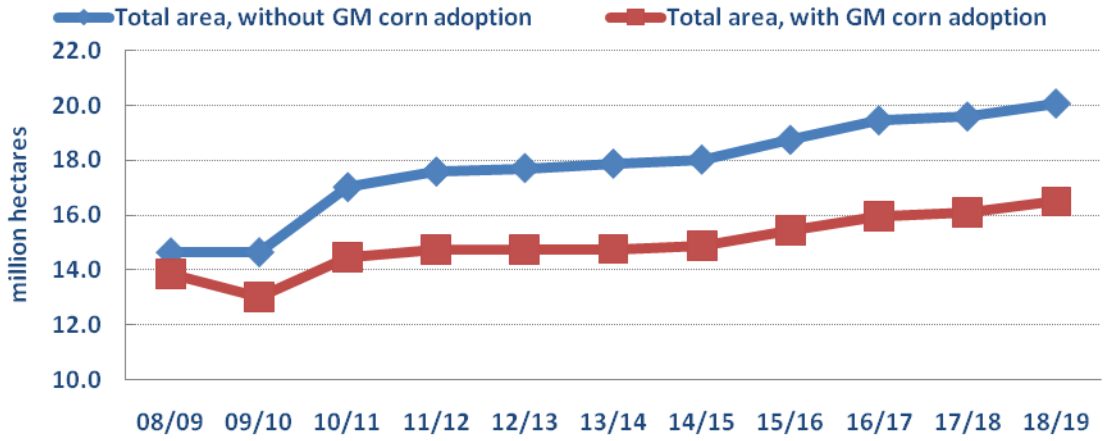
In a scenario without the adoption of agricultural biotechnology, farmers would need a more expressive economical and environmental effort, to face the growing demand for food, fibers and biofuels

Brazilian cotton planted area for the next 10 years



An extra effort of 1.44 million hectares to be planted in the coming 10 years

Brazilian corn planted area for the next 10 years



Also, an extra effort of 30.9 million hectares to be planted in the coming 10 years

Source: CÉLERES® based on own land usage model simulation

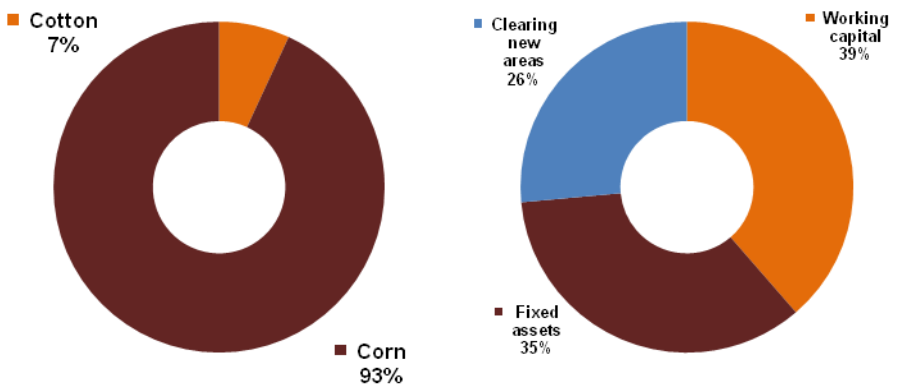
The additional effort of planted area, without the adoption of biotechnology, would mean a significant impact as economical and environmental perspectives

Additional area:
32.4 million hectares

- Investments in Ag machinery
- Expenses with direct production cost
- Investment in clearing new virgin areas

Management & economical perspective

$ 108 billion
needed to finance such planted area

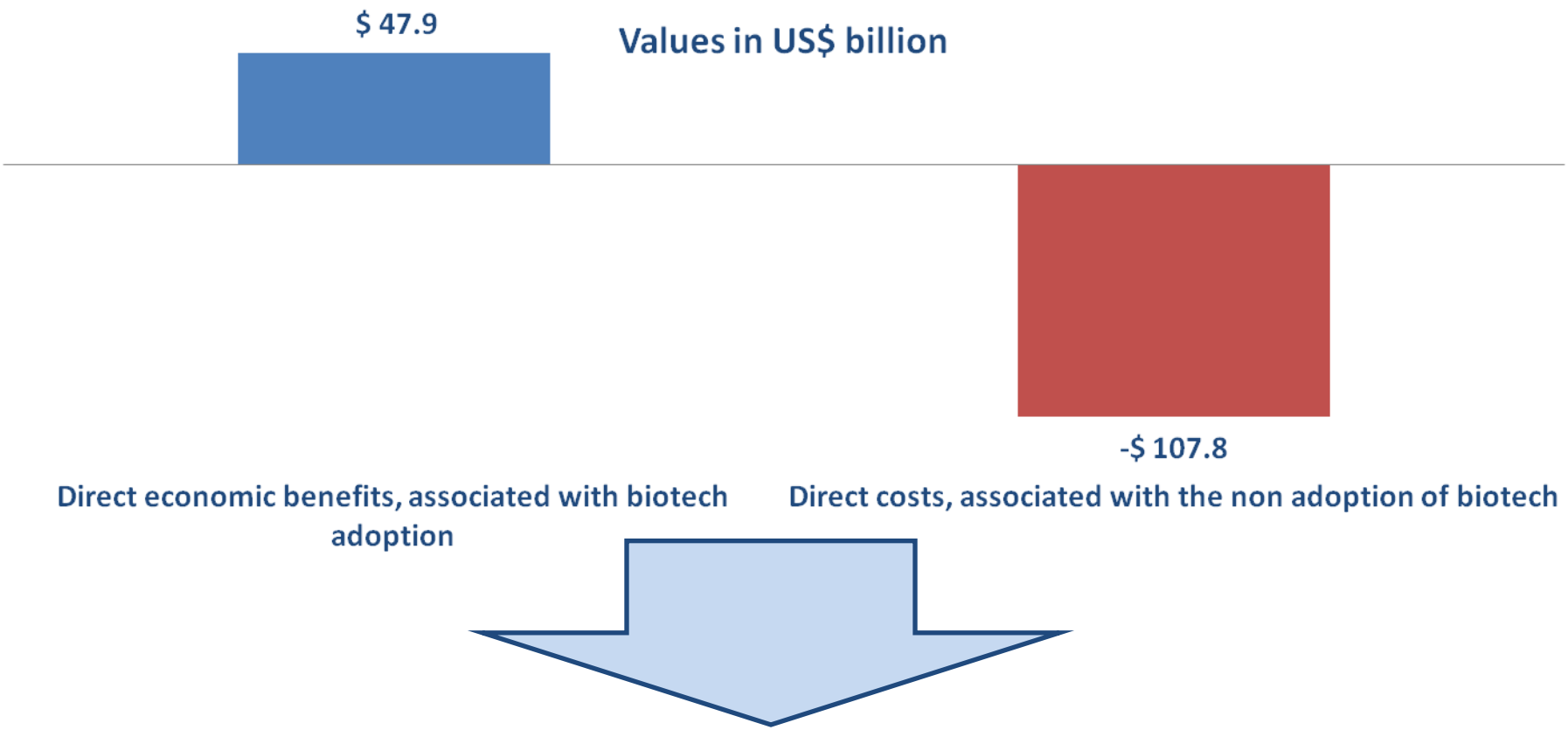


Environmental perspective

- Greenhouse gases emissions
- Loss of biodiversity
- Soil losses
- Depleting natural resources

Source: CÉLERES® based on own land usage model simulation

For the next ten years the cost of not having biotech would be over the double of the expected economic benefits



This final conclusion makes mandatory to a country like Brazil to keep improving the institutional framework in order to allow further developments in new technologies

Source: CÉLERES® considering the adoption of biotech cotton, corn and soybean for the next 10 years

The company

- A local consulting company with a team with over ten years of experience in the analyze and advise of projects in the Brazilian agriculture
- Through these year, we have done studies and analyzes in:
  - Agribusiness economic scenario
  - Project analysis for agrindustrial investments
  - Biotechnology economical and risk assessment
  - Business advisory and outsourcing in agribusiness deals
- We perform our analysis and studies with an agri food chain approach, with clients distributed along this value chain, from input companies up to final consumers
- We are driven by complete dedication to our client's needs. Our activities are performed by an experienced team of advisors, under principles of integrity and discretion.

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